

# **Guide Specification for EF-400™ Modified Emulsion Liquid Applied Air/Vapor Barrier System**

*Specifier Notes: This guide specification is written according to the Construction Specifications Institute (CSI) format. The sections must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the project. Coordinate this section with other specification sections and the drawings.*

*Specifier Notes: EF-400 is a single component, liquid applied, polymer modified, water-based emulsion designed as an air and vapor barrier coating. EF-400 cures to form a tough, seamless, elastomeric membrane, which exhibits excellent resistance to air and moisture transmission. EF-400 has been specifically formulated to act as an air/vapor barrier system within the building envelope. It may be applied to most common surfaces and integrated into various wall systems. Ef-400 is suitable for both new construction and restoration.*

## **Part 1 GENERAL**

### **1.01 SECTION INCLUDES:**

- A. Materials and installation methods for a liquid applied air/vapor barrier system located in the non-accessible part of the wall.
- B. Roof membrane air barrier.
- C. Materials and installation to bridge and seal the following air leakage pathways and gaps:
  - a. Connections of the wall to the roof air barrier
  - b. Connections of the walls to the foundations.
  - c. Seismic and expansion joints
  - d. Openings and penetrations of window frames, store front, curtain wall.
  - e. Barrier pre-cast concrete and other envelope systems.
  - f. door frames
  - g. Piping, conduit, duct and similar penetrations
  - h. Masonry ties, screws, bolts and similar penetrations
  - i. All other air leakage pathways in the building envelope.

### **1.02 RELATED SECTIONS**

- A. Section 03300 Cast-in-Place Concrete:
  - 1. Concrete back-up walls
  - 2. Under slab vapor retarder
- B. Sections 04200 Unit Masonry:
  - 1. Masonry backup walls
  - 2. Masonry veneer cavity walls

## **1.02 RELATED SECTIONS CONTINUED**

- C. Section 07131 Self Adhering Sheet Waterproofing: Below grade waterproofing.
- D. Section 07140 Fluid Applied Elastomeric Waterproofing
- E. Section 07160 Bituminous Dampproofing: Below grade damp-proofing.
- F. Section 07210 Building Insulation: Insulation with integral vapor retarder facing
- G. Section 07530 Single-Ply Membrane roofing
- H. Section 07620 Sheet Metal Flashing and Trim: Sheet metal flashings
- I. Section 07900 Joint Sealers: Joint sealant materials and installation
- J. Section [     ] Door Frames
- K. Section 08520 Aluminum Windows
- L. Section [     ] Aluminum Storefronts and Entrances
- M. Section 08920 Glazed Aluminum Curtain Walls
- N. Section 09253 Gypsum Sheathing: Gypsum sheathing over covered metal studs.

## **1.03 REFERENCES**

- A. ASTM E-96-001e1- Standard Test Methods for Water Vapor Transmission of Materials- Desiccant Method
- B. ASTM D4112-98a(2002)e1 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension (should D 2370 be used)
- C. ASTM D 580-98 Standard Test Method for Water Absorption of Plastics
- D. ASTM D903-98 Standard Test method for Peel or Stripping Strength of Adhesive Bonds

### **1.03 REFERENCES CONTINUED**

- E. ASTM D2697-86 (1998) Standard Test Method for Volume Nonvolatile Matter in Clear or Pigmented Coatings
- F. ASTM D3960 Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
- G. ASTM D 1970-01 Standard Specifications for Self Adhering Polymer Modified Bituminous sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection-Section 7.9 Nail Sealability
- H. ASTM D4541 Standard Test method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

### **1.04 PERFORMANCE REQUIREMENTS**

Provide air/vapor barrier constructed to perform as a continuous air/vapor barrier and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation of water penetration. Membrane shall accommodate movements of buildings materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.

Commonwealth of Massachusetts Building Code Requirements: The intent of this specification is to require compliance with 780 CMR 13, including Section 1304.1.2 Moisture Control and 1304.3 Air Leakage.

1. code 780 CMR 1304.1.2 Moisture Control:
  - a. A vapor barrier (material) having a maximum permeability of zero point one (0.1) perm or less (equivalent to a 4 mil polyethylene sheet) shall be installed on the winter warm side of walls, ceilings and floors enclosing a conditional space.
2. Code 780 CMR 1304.3.1 Air Barriers: “The building envelope shall be constructed with a continuous air barrier to control air leakage into or out of the conditional space.” The air barrier shall have the following characteristics:
  - a. The material used must be continuous with all joints made air-tight.
  - b. The material used shall have an air permeability not to exceed 0.004 cubic feet per minute per square foot under a pressure differential of 0.3 in. water (1.57psf)(0.02L/s.m squared @ 75 Pa.) when tested in accordance with ASTM E2178-01.

## 1.04 PERFORMANCE REQUIREMENTS CONTINUED

- c. The material shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damages or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
- d. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for relative movements of systems due thermal and moisture variations and creep.
- e. Connection shall be made between:
  - 1. Foundation and wall.
  - 2. Walls and windows or doors
  - 3. Different wall systems.
  - 4. Wall and roof.
  - 5. Wall and roof over unconditional space.
  - 6. Walls, floor and rood across construction, control and expansion joints.
  - 7. Walls, floors and roof to utility, pipe and duct penetrations.

3. Code 780 CMR 1304.3.2, Air Barrier Penetrations: All penetrations of the air barrier and paths of air infiltrations/exfiltration shall be made air-tight.

Provide an air barrier assembly that has been tested in accordance with Air Barrier Association of America's (ABAA's) approved testing protocol to provide air leakage results not to exceed 0.2L/s/m squared@75 Pa (0.04cfm/sf @ 1.57 psf)

Provide an air barrier material tested in accordance with the Air Barrier Association of America's (ABAA test protocol to provide air leakage results not to exceed 0.02 L/s/m squared @ 75 Pa (0.004 cfm/sf @1.57 psf)

Provide an air barrier component tested in accordance with the Air Barrier Association of America's (ABAA test protocol to provide air leakage results not to exceed 0.02 L/s/m squared @ 75 Pa (0.01 cfm/sf @1.57 psf)

## 1.05 SUBMITTALS

Provide submittals in accordance with Section 01300 – Submittal Procedures

## **1.06 QUALITY ASSURANCE**

### **A. Installer Qualifications:**

1. The air barrier contractor shall be, during the bidding periods as well as for the duration of the installation, officially recognized as a licensed contractor by the Air Barrier Association of America (ABAA). The contractor shall carry liability insurance and bonding.
2. Each worker who is installing air barriers must be either a Certified Applicator or an installer who is registered with ABAA
3. Each Lead Certified Applicator can supervise a maximum of five registered installers. The Certified Applicator shall be thoroughly trained and experienced in the installation of air barrier of the types being applied. Lead Certified Applicators shall perform or directly supervise all air/vapor barrier work on the project.

B. Air/vapor barrier installers must be trained and certified by NECA (National Energy Conservation Association) and PSDI (Professional Skill Development Institute for Energy Conservation).

C. Single Source Responsibility: Obtain air/vapor barrier materials from a single manufacturer regularly engaged in manufacturing the product.

D. Provide products which comply with all state and local regulations controlling the use of volatile organic compounds (VOCs).

## **1.07 DELIVERY STORAGE AND HANDLING**

- A. Deliver materials to project site in original packages with seals unbroken, labeled with manufacturer's name, product, date of manufacturer and directions for storage.
- B. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature ranges required by air/vapor barrier manufacturer.
- C. Store at temperatures above 32°F (0°C), free from contact with cold or frozen surfaces.
- D. Protect materials during handling and application to prevent damage or contamination.

## **1.08 ENVIRONMENTAL REQUIREMENTS**

- A. Product not intended for uses subject to abuse or permanent exposure to the elements.
- B. Do not proceed with product application during rain or inclement weather.
- C. The air temperature of application of the EF-400 can be as low as 26°F
- D. Do not apply to frozen substrate

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURER**

Seaboard Asphalt Products, specifically for Ultimate Epoxy of Lake Orion, Michigan. (248) 391-8118; or on the web: [www.ultimateepoxy.com](http://www.ultimateepoxy.com)

### **MATERIALS**

- A. Liquid Air Vapor Barrier System: One component, polymer modified, cold applied liquid air/vapor barrier membrane.
  - 1. Performance Based Specifications: Air/vapor membrane shall be an elastomeric asphalt emulsion having the following characteristics:
    - a. Pair Permeability ASTM E2178: 0.00159cfm/ft squared @ 785 Pa (1.57 lbs./ft squared)
    - b. Water Vapor Permeance ASTM E96: 0.134 perms
    - c. Elongation ASTM D412:800%
    - d. Tensile Strength ASTM D412: 41.3psi.
  - 2. Proprietary Based specification: EF400 Modified Emulsion Coating by Seaboard Asphalt

### **2.03 ACCESSORIES**

- A. Flashing and Transition Membrane: self adhesive polymeric air/vapor barrier membrane having a thickness of 40 mils (1.0mm)
- B. Primer
  - 1. Temperatures above 40°F (4°C): Water Based Primer
  - 2. Temperatures above 30° (-1°C):VOC Compliant Solvent Based Primer

## **Part 3 EXECUTION**

### **3.01 EXAMINATION**

A. Examine surfaces to receive membrane. Notify architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

### **3.02 SURFACE PREPARATION**

- A. Protect adjacent surfaces not designated to receive air/vapor barrier.
- B. Clean and prepare surfaces to receive air/vapor barrier membrane in accordance with manufacturer's instructions.
- C. Do not apply membrane to surfaces unacceptable to manufacturer.
- D. Concrete surfaces must be clean, free of standing water, ice, snow, frost, dust, dirt, oil, curing compounds or any foreign material that could prevent proper adhesion of the membrane.
- E. Patch all holes and voids and smooth out any surface misalignments.
- F. Patch all cracks, protrusions, small voids, offsets, details, irregularities and small deformities with cementitious patching mortar at least two hours before application.
- G. Ensure joints between dissimilar building materials are sealed with a strip of self-adhesive membrane 6" (150mm) wide, centered over the joint.
- H. If using exterior sheathing panels, ensure all joints over 1/4" are tape with minimum 2" wide contractor's mesh style wall tape. Staple mesh tape to panels if spraying air/vapor barrier membrane.

### **3.03 APPLICATION**

- A. Apply air/vapor barrier membrane in accordance with manufacturer's instructions.
- B. Apply membrane by spray or roller at a minimum coverage rate of 20-25ft squared/gallon (60 mils wet), (40 mils dry). Two coats (30 mils wet) may be necessary.
- C. Frequently inspect surface area with a wet mil gauge to ensure consistent thickness.

### **3.03 APPLICATION CONTINUED**

D. Work material into any fluted rib forming indentations.

E. Cured thickness of membrane should be 40 mils dry.

F. Avoid use of products which contain tars, solvents, pitches, polysulfide polymers or PVC materials that may come into contact with air/vapor barrier system.

### **3.04 PROTECTION**

A. Cover air/vapor barrier membrane as soon as possible or within 145 days.

END OF SECTION